



The evidence for the effectiveness of family- and center-based early childhood education programs

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Abstract:

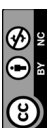
Early Childhood Education (ECE) provides compensatory educational programs both in pre-schools and the early grades of primary school, and for parents at home. The aim of this policy is to prevent young children from disadvantaged backgrounds starting formal schooling with significant educational delays. In many countries ECE programs are in existence for several decades now. The search in this article is for the scientific evidence-base of this policy. While the focus is on the Netherlands, the findings probably also are valid for many other countries.

1. Educational disadvantage

Equality and especially equity in education have been high on the political agenda's for several decades now, often already since the 1960s or 1970s (OECD, 2012a). And, as a consequence, so are policies to prevent and combat educational disadvantage resulting from factors in the home environment of children, more specifically parental low socioeconomic status and ethnic/racial minority or immigrant origin (OECD, 2015; Stevens, Dworkin, 2019). It is assumed that the so-called social, cultural and linguistic capital (*cf.* Bernstein, 1971; Bourdieu, 1986; Coleman, 1988) which is available to children from middle and upper socioeconomic backgrounds and which prepares them for a successful school career is lacking in working class and minority and immigrant families. To compensate for this "deficit" a diversity of educational stimulation programs and activities have been developed and implemented, both in educational institutions and for parents at home. Despite the investment of huge budgets by national and local authorities the results of these endeavors are rather disappointing (Demeuse, Frandji, Greger, Rochex, 2012; Driessen, 2012). In fact, several recent studies indicate that educational gaps by class and origin have failed to close or even are on the rise (Hanushek, Peterson, Talpey, Woessmann, 2019; OECD, 2018). According to Reardon (2011) this is due to widening income inequality and an increased investment of affluent parents in their children's cognitive development, particularly in early childhood.

2. A shift to the early years

In recent decades, the educational disadvantage policy's focus is increasingly being placed upon the preschool and early years of primary school. Reasons for this shift are the disappointing results of compensatory initiatives undertaken in later years and the consequence of the growing recognition of the importance of the early years for a child's development (*cf.* Heckman, 2000; Marope, Kaga, 2015). Studies show that most of the disparity between children with poor and children with rich parents is already there from when the children



enter kindergarten (Driessen, Merry, 2014; Passaretta, Skopek, 2018). And because there is evidence that achievement gaps are self-perpetuating, it is assumed that the earlier the interventions take place to reduce them, the more effective they will be at eliminating them in the long run (Reardon, 2011).

Under the banner of Early Childhood Education (or Early Childhood Education and Care), a wide array of family- and center-based intervention programs for disadvantaged children between the ages of 0 and 7 years has thus been developed and implemented (Brańska, 2012; Kagan, 2019; OECD, 2012b). While the emphasis primarily is on the children's linguistic and cognitive development, programs often also include social, emotional, physical and health components, and this may be combined with educational and pedagogical support for the parents. The basis for these programs lies in the USA, where in 1965 the federal Head Start program (which comprises a high diversity of specific subprograms and services) began as part of president Lyndon B. Johnson's Great Society campaign. In the same decade also some unique small-scale longitudinal experimental programs were set up. Because at the time there was an unbridled confidence in positive outcomes (the so-called makeable society), such initiatives were adopted and implemented in many other countries.

3. Educational disadvantage policies

In the Netherlands, the first national policy for combating educational disadvantage was launched in 1974 and focused on native-Dutch working-class children and their parents. In later years a parallel policy was initiated that aimed at children and parents of ethnic minorities (typically so-called guest-workers and immigrants from former colonies). In 1985 both separate policies were integrated into one educational priority policy because it was believed that both target groups had the same problems and that thus one and the same educational approach would be appropriate and would suffice. Not everyone was convinced of this argument, however. It was argued that, different from native-Dutch parents, immigrant parents often face unique problems, for instance with learning a new language, with having to integrate in a modernistic culture, and with coping with a highly secularized society. In addition, immigrant parents are expected to accept, acquire and practice (modern) child-rearing and socializing methods that may differ significantly from the (traditional) ones common in their home country.

An important feature of the Dutch educational disadvantage policy, in a financial sense, is the so-called student weighting system which awards primary schools and municipalities additional budgets from the Ministry of Education (Ladd, Fiske, 2009). They may use this extra money for providing extra help to the policy's target groups. The amount of extra budget is based on socioeconomic and ethnic features of the children's parents. To a large extent the schools are free to spend the money; most schools use it to create smaller classes, but there also are many schools that invest in extra parental involvement activities, especially in the lower grades (Cebeon, 2016; Driessen, 2017). According to an evaluation committee appointed by the Ministry of Education, the interventions too often focus on the children and not enough on the children's home environment and parents. In addition, this committee is of the opinion that an effective educational disadvantage policy needs more coordination and collaboration of the various parties involved ("partnership"), including the parents (IBO, 2017).

In this article the focus is on one of the components of the educational disadvantage policy, *viz.* early childhood education. Firstly, an overview of the various Dutch programs will be presented. Thereafter the results of a review of the international and Dutch evidence for the effectiveness of these programs will be summarized. The main question is whether the optimism of especially policymakers is warranted. This is important because it will provide policymakers with evidence-based information regarding the continuation and possibly adjustment of the current policy. In closing, some conclusions will be drawn.

4. Early childhood education

Family- and center-based programs

Nowadays, the most important intervention of the Dutch educational disadvantage policy is Early Childhood Education (ECE). ECE services have been implemented since the 1970s, but it was not until the 1990s that this occurred at a larger scale. At the time, a series of so-called family-based programs and services were



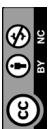
developed aiming at young children and their parents with an accent on the stimulation of the development of the child and/or the provision of parental support. The programs are primarily targeting parents and, through them, the children. An important objective of such programs is to teach the parents the skills needed to stimulate the cognitive, linguistic, and motor development of their children. In addition, the parents may also receive actual support with respect to child-rearing and the social functioning of their children, often from semi-professionals. The so-called Step Programs (“Stap”) are well-known family intervention programs in the Netherlands. In one such program (“Instapje”), intended for 1- and 2-year-olds, a professional visits the family once every week and plays with the child and talks with the mother who learns to support and stimulate her child’s development. In another program (“Opstapje”) for 2- to 4-year-olds, the child is being prepared for the kindergarten grades of primary school by stimulating the child’s play and the parent-child interaction. In addition to home visits by a professional, who often speaks the same language as the (immigrant) mother, there also are parent meetings where parents exchange their experiences. The “Opstap” program is for 4- to 6-year-olds and their parents (mostly the mother) and supports them in preparing their child for learning to read, write and count in third grade of primary school. There are weekly home visits by professionals and also parent meetings. Center-based programs are predominantly conducted in preschools and in the kindergarten groups of primary schools. The emphasis in these programs can differ. There are, for example, programs to stimulate cognitive development and programs to stimulate language development. There are also integral programs, combining several developmental areas, with Pyramid (“Piramide”) and Kaleidoscope (“Kaleidoscoop”) constituting the two best-known. Piramide is for 2- to 7-year-olds at daycare centers, play groups and kindergartens. It focuses on stimulating a broad development and preventing or combatting educational disadvantage. It brings together play and learning and uses a thematic approach. Kaleidoscoop is for 2- to 6-year-olds in daycare centers and kindergartens and concerns an adaption of the American Perry/HighScope method. Active learning constitutes the core of the program with an emphasis on exploring, expanding and deepening knowledge. ECE at Home (“VVE Thuis”) is a program for parents of 3- to 6-year-olds who participate in center-based programs such as Piramide and Kaleidoscoop. Because there is a connection between the two, words, concepts and curriculum content are addressed both in the center and at home. Parents learn how to stimulate and support their children in their development. In this way parental involvement will increase (NJI, 2019).

A focus on center-based programs

In 1994 a study into effects of ECE commissioned by the Dutch Ministry of Education, concluded on the basis of experiences in the USA that center-based programs for young children would probably be more effective than family-based programs (Leseman, Cordus, 1994). This led to the development of comprehensive center-based programs and a shift away from family-based programs. The consequence is that the focus now is on professionals in educational institutions, and much less on semi-professionals, volunteers and parents at home. Since 2006 ECE is part of the Educational Disadvantage Policy and a cooperative effort of municipalities and schoolboards. On the basis of the student weighting system target group children are identified and extra budgets are awarded to municipalities and schools. A total of € 490 million is awarded to municipalities for 2.5- to 4-year-olds in pre-school education, and a total of € 260 million to schoolboards for 4- to 7-year-olds in early-school education (budgets for 2019/2020; Ministerie van OCW, 2019). It is estimated that as of 2019/2020 for a total of 170,000 children in the pre-school phase an average extra budget of € 2,850 per child will be awarded to pre-school institutions; for a total of 100,000 children in the early-school phase the extra budget for schoolboards will be € 2,750 per child. The children will attend the special stimulation programs for at least 16 hours per week (Ministerie van OCW, 2018).

International evidence of effectiveness

It is obvious that the Dutch government has high hopes for positive effects of ECE (and in that regard it does not differ from many other governments). The question is, however, where all this optimism comes from. The Dutch ECE policy and specifically the belief in its success is mainly built on studies into the effectiveness of ECE conducted in the USA. Ever since the 1960s many hundreds of studies of ECE programs have been



done. Right from the beginning, in the discussions regarding the promotion of ECE so-called model programs were and still are often mentioned. These include some high-quality longitudinal randomized experiments conducted in the USA. They started in the 1960s and 1970s and the children that participated then have been followed for several decades afterwards.

An often mentioned model program is the Abecedarian Project (Campbell, Ramey, Pungello, Sparling, Miller-Johnson, 2002; Coalition for Evidence-Based Policy, 2016a; PPN, 2019a). This project started in 1972 with 57 children in the experimental group; their development was compared with that of 54 children in a control group. The typical mother was African-American, 20 years of age, had had 10 years education, was not married, lived in with her parents, and had no income. The children participated from birth until they were 8 years of age, the whole day, 5 days a week, and 52 weeks a year. The intervention focused on the domains of knowledge, language, and behavior. The educational activities themselves were game-based and emphasized language development. Until they were 3, 1 staff member per 3 children was available, and thereafter 1 per 6 children. In addition to activities at the daycare center school, the intervention included activities for the mothers at home. In the school phase, a so-called resource teacher was assigned to each child and mother, who prepared an individualized set of home activities to supplement the school's curriculum in reading and math, taught the mothers how to use these activities with their children, tutored children directly, met regularly with classroom teachers to ensure that home activities aligned with the ones being taught in school, served as a consultant for the classroom teacher when problems arose, and advocated for the child and family within the school and community. The resource teachers made some 15 home visits per year; in addition, they offered children a variety of summertime supports, including help with summer camp, trips to the public library, and tutoring in reading skills. This project cost \$18,000 per child per year (price index 2013).

A second model program is the Perry Preschool project (Barnett, 2001; Campbell *et al.*, 2002; Coalition for Evidence-Based Policy, 2016b; Heckman, Pinto, Savelyev, 2013; PPN, 2019b). This project started in 1962 with 58 3- and 4-year-olds growing up in a deprived black neighborhood. For 2 years the children visited a pre-school for 5 half-days; a control group of 65 children did not go to pre-school. The background of the children to a large extent was comparable to that of the Abecedarian Project. There was one crucial exception: the children were not only selected on the basis of demographic features of their home environment, but also on the basis of their low intelligence. Only children with an IQ of between 70 and 85 points could participate, that is, children that are normally referred to special education institutions because of developmental delays and learning disorders. In addition to the learning in the pre-school group, there was a strong home learning component. The program approached the children as active learners, who learn best from activities that they themselves plan, carry out and reflect on. The role of the adults was to observe, guide, support and help to extend the children's activities by arranging and equipping diverse interest areas within the learning environment, maintaining a daily routine that allowed the children to plan and carry out their activities, joining in with the children's activities and helping the children to reflect on their play. In addition to the daily classroom sessions for the children (2.5 hours in the morning), the teacher once a week made home visits to the mother and her child (1.5 hours in the afternoon). The home visits were intended to promote mother-child interaction, to involve the mother in the educational process, to help her to provide education support and to implement the curriculum at home. The project's staff members all were highly educated and had obtained a certificate to teach at a pre-school, a primary school, and also in special education. During the project 1 staff member was available for every 5 to 6 children. This project cost \$11,300 per child per year (price index 2007).

Both experiments showed positive effects, though not always in the same phases and on the same outcomes (Bailey, Duncan, Odgers, Yu, 2017). Both had end-of-treatment effects, but Perry showed short-term fade-out effects. They also showed various positive effects in the long run (the children were followed for decades). Because of its randomized experimental character, for many researchers and politicians these positive program results have become the ultimate proof of the effectiveness of ECE. According to several scholars this optimism is not justified, however (Bauchmüller, 2013; Hanushek, Lindseth, 2009; Lowenstein, 2011). For instance, because of demographic developments the situation regarding the availability and quality of ECE has changed dramatically; in addition, the situation in the USA deviates significantly from that in many European countries. Furthermore, the model projects differ considerably from regular ECE in terms of budgets, staff, quality, duration, intensity, and scientific supervision.



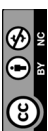
In addition, Slavin and Smith (2009) show that in such experiments with small samples any effects will be dramatically inflated. For instance, in a sample of less than 50 children the average effect is 0.44, but in a sample of more than 2,000 children this effect is not more than 0.09. Heckman *et al.* (2013) claim, however, that by using advanced statistical techniques it is possible to correctly estimate significance in small samples. But the question remains whether this also applies to the effect estimates themselves. According to Burger (2010) a direct comparison of American and European interventions not only is problematic because of huge quality differences in the implementation of the programs, but also because American children in general are in a much more unfavorable and disadvantaged position than their European peers. With regard to the Perry Preschool project it should again be mentioned that the target group not only was selected because of their unfavorable home situation, but also for their very low level of intelligence. In the Netherlands (and most other countries) these children would have gone to special education institutions. That is the reason why in the Perry project staff also had a special education training and diploma. Some researchers (van de Kuilen and van Dongen, s.a.; quoted from Wikipedia, 2016) assume that the effects found are not a direct result of participating in the ECE program, but an indirect consequence of the fact that the children were away from home and that this allowed the very low-educated mothers to finish an education and by doing so not only acquired more educational and cultural capital, but also had much better opportunities in the labor market.

Recently, the Dutch Central Planning Office (CPB, 2016) made an inventory of methodologically sound studies into the effects of ECE, more specifically, randomized experimental studies and quasi-experimental studies controlling for selection effects. The results were outright shocking: the number of sound studies they found was extremely limited. According to the CPB there is no ECE study at all in the Netherlands that meets their methodological standards. The situation in other countries is hardly any better, however.

For a number of possible ECE actions in center-based and family-based settings (in a center: ECE for all target children, quality improvement, better trained staff, more ECE hours, abolishment of ECE; at home: reading aloud at home, extra home visits) the PCB computed the children's learning gains. Their analyses showed that each of the actions would lead to no or only very small learning gains. The effects for the center-based actions varied from -0.05 SD to 0.07 SD, and thus were very small at best. The greatest gains (0.07 SD) were expected when the number of ECE hours in the pre-school phase, at the time 10 per week, would increase to 24 hours per week, which would thus be full-time for a toddler. This would cost an extra investment of € 5,100 per child per year over and above the (at the time) regular costs of € 3,600. The effects for the family-based actions were 0.00 SD for reading aloud (*i.e.*, no effect) and 0.06 SD for extra home visits. The costs for extra home visits would be enormous, however (€ 8,466 per child).

For their analyses the CPB made use of (only) one evaluation of the Head Start program which was launched in the USA in 1965 and which focuses on the pre-school phase. Though Head Start is a national program aiming at families living under the poverty line, it in fact constitutes a mishmash of all sorts of local projects, often with a strong parent component. Programs aim at supporting and strengthening parent-child relationships and engaging families around the children's learning and development (Office of Head Start, 2019; USC, 2007). Head Start considerably differs from the Dutch ECE, not only in terms of target group, organization, design, content, duration and intensity, but also in terms of mode of financing and budgets. From the selected Head Start study, based on a random assignment of 4,442 children to a national sample of Head Start centers (Puma *et al.*, 2012), it appears that the results are very ambiguous and not straightforward at all (also see Bailey *et al.*, 2017). The relevant study reports a total of no less than 414 effects in not only the cognitive and social-emotional domains, but also pertaining to health and parenting practices. Only 60 of the 414 effects are significant at the extremely tolerant level of $p < 0.10$, with 8 effects that are negative and 48 effects that are positive. The maximum positive effect is 0.35, but there are also negative effects up to -0.24 . Puma *et al.* (2012: xvii) summarize their findings as follows: "...there were initial positive impacts from having access to Head Start, but by the end of 3rd grade there were very few impacts found ... in any of the four domains of cognitive, social-emotional, health and parenting services. The few impacts that were found did not show a clear pattern of favorable or unfavorable impacts for children." In other words, the empirical basis for the CPB advice regarding the (dramatical) increase of the number ECE hours clearly is lacking.

In addition to the evaluations of the so-called model programs, the results of many hundreds of other studies have been summarized in quantitative reviews and meta-analyses (*e.g.*, Andrews, Slate, 2001; Bailey *et al.*, 2017; Barnett, 2008; Bauchmüller, 2013; Blok, Fukkink, Gebhardt, Leseman, 2005; Burger, 2010; Camilli,



Vargas, Ryan, Barnett, 2010; Chambers, Cheung, Slavin, 2015; DeAngelis, Holmes Erickson, Ritter, 2018; Diamond, Justice, Siegler, Snyder, 2013; Elango, García, Heckman, Hojman, 2015; Gilliam, Zigler, 2001; Karoly, Kilburn, Cannon, 2005; Kholoptseva, 2016; Lowenstein, 2011; Marope, Kagae, 2015; Melhuish *et al.*, 2015; Saracho, 2015; Ştefan, Miclea, 2010; Van Huizen, Plantenga, 2018; Yoshikawa *et al.*, 2013). The conclusion usually drawn is that *high-quality* programs *may* have a positive effect on not only the children's school career, but also on their success in the labor market and functioning in society. Effects are found to be larger in the pre-school phase than in the early school phase. In general, cognitive effects are larger than non-cognitive effects, but both tend to fade out after some time or disappear altogether. Some studies compared center-based programs with family-based programs and found that the mixed model combining center-based provisions with home visiting had the most wide-ranging and strongest positive impact. Center-based interventions and combined center- and family-based interventions produced greater effects in the cognitive domain than did family-based programs, but not in the socioemotional domain. The inclusion of coaching of parenting skills was also positively related to outcomes in the cognitive domain.

To illustrate the strength of such effects, the results of the meta-analysis by Camilli *et al.* (2010), combining a total of 123 separate studies, may be illustrative. The effect size Cohen's *d* for the cognitive domain was 0.23, for the school domain 0.14, and for the social domain 0.16. According to the rule of thumb provided by Cohen (1988), an effect size of below 0.20 is negligible, between 0.20 and 0.50 small, between 0.50 and 0.80 medium, and above 0.80 large. Thus, it must be concluded that on average, the effects of ECE are negligibly small.

5. The Dutch evidence

NJI (2019) presents an overview of the main ECE programs used in the Netherlands, 8 integral programs for educational institutions, *i.e.* center-based, but sometimes with a modest family component, and 7 family-based stimulation programs. All of these programs have officially been recognized by a commission that evaluates the quality and effectivity of such programs. On the basis of a number of criteria each of these 15 programs have been evaluated and awarded a score between 1 (lowest; no effect study available) and 4 (highest; two experimental studies showing positive effects). Of the 8 center-based programs only 2 were the topic of some sort of "effect" study; the results were inconsistent and any effects were small. None of the other 6 programs have been evaluated by means of an effect study. Of the 7 family-based programs a few have been evaluated in quantitative or qualitative study, but not in a real effect study. All of the family-based programs have received the lowest score 1. Taken together, 13 studies received the lowest score of 1, and 2 studies the score 2. This overview shows that, according to NJI, none of the ECE programs used in the Netherlands is evidence-based. Striking is the fact that 87 percent of the ECE programs in the Netherlands which have officially been recognized and recommended by the Ministry of Education have not been evaluated in a methodological sound effect study at all.

In a comprehensive statistical meta-analysis, Fukkink, Jilink and Oostdam (2017) integrated the results of all available Dutch large-scale retrospective quasi-experimental and small-scale experimental studies conducted in the period 2000 to 2015. The emphasis was on center-based interventions. They analyzed 11 separate studies with 21 different sub-studies, comprising a total of 165 effect measures in the domains of language, numeracy, general intelligence and socio-emotional development. For the sake of comparability, the outcome measures were converted into the standardized effect size Cohen's *d*. Their findings showed that the aggregated effect for none of the domains discerned differed significantly from zero; in other words: none of the effects was significant. The effect estimate *d* was 0.03, or – in the words of the researchers – "smaller than small". This finding was based on a total of more than 50,000 children and 60 million hours of ECE.

In 2009 the Dutch Ministry of Education initiated a unique large-scale (longitudinal) cohort study called Pre-COOL with the intention of gaining a better insight in the outcomes and effects of pre- and early-school education, *i.e.* of center-based programs. Recently the first findings were published (Leseman, Veen, 2016). First of all, it is important to point to the fact that the researchers encountered many methodological difficulties, which made it nearly impossible to draw unequivocal conclusions. In this cohort study the developments of three ECE target groups were compared with those of the non-target group. These groups were identified on the basis of three home environment indicators, specifically: parental education, parental ethnicity, and



home language. Longitudinal comparisons were made for five effect measures: selective attention; vocabulary; play-work attitude; counting skills; and language skills. The effect sizes in terms of Cohen's d varied from -0.44 to +0.46; in other words, sometimes the ECE target group children gained on the non-target children, and sometimes the differences increased. In no more than one analysis on a total of 15, a positive effect of ECE appeared, namely regarding vocabulary (+0.46, which means that ethnic minority children progressed more than native-Dutch children).

6. Conclusions

ECE provides stimulation through special compensatory programs in preschool institutions and the first grades of primary schools, sometimes combined with educational services for parents at home. The aim of these center-based and family-based programs is to prevent young children from disadvantaged backgrounds starting formal schooling with significant educational delays. Although ECE is in existence for many decades now, there is no unequivocal empirical evidence that it really works or, in other words, the evidence base is lacking. Insofar any effects have been reported, they are mostly small or even very small, vary per domain and fade out after some years.

In addition to these very disappointing findings, Fukkink *et al.* (2017) suspect that in a number of the Dutch studies they included in their statistical meta-analysis there is a strong bias towards reporting only positive effects (for similar conclusions see: Aleman, van Tuijl, 2000; Burger, 2010). This so-called file-drawer problem would imply that their effect estimates, which already are extremely small, are inflated and in reality are even smaller. According to these researchers the absence of positive effects seems to be an inconvenient truth for the stakeholders, *i.e.* policymakers and politicians, who, in the light of the ruling socio-political ideology and the heavy investments already made, are interested in positive outcomes only (Eldering, 2002).

The question is to what extent all this also applies to other countries. The effects reported in international meta-analyses and certainly those for the USA generally are stronger (although in an absolute sense they still are not very strong). Apart from the many methodological issues described here, differences may be explained by demographic variation: the income gap in the USA is greater than that in many other countries and this impacts the starting position of disadvantaged children (CPB, 2016). In the Netherlands, the differences probably are much smaller and as a consequence it is more difficult to close the gap. In addition, differences may also be explained by the fact that regular preschool services in the Netherlands generally are of high quality and do not differ that much from special ECE programs (Fukkink *et al.*, 2017).

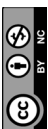
No matter the exact explanation for outcome differences between the Netherlands and the USA, the findings reported here show that there is no empirical support for the present Dutch ECE policy, the evidence base simply is lacking. On the one hand, this may be a consequence of the absence of methodologically sound studies. This certainly applies to family-based ECE interventions, making it impossible to give evidence-based advice as to what low-SES and minority parents can do to improve their children's starting position in school. On the other hand, this may also be related to too much optimism on the part of politicians regarding the makeability of society. It was Basil Bernstein who in 1970 asserted that "education cannot compensate for society", but perhaps we still must try?

Note

Minor parts of this article have been published in G. Driessen (2017). Early childhood education intervention programs in the Netherlands. Still searching for empirical evidence. *Educational Sciences*, 8(1), 3 [1-8].

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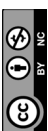
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